Universal Access Wheel: Towards Achieving Universal Access to ICT in Africa

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Abstract

This paper argues against the idea that simply providing access to information and communication technology devices and infrastructures in semi-urban, rural and remote locales has accelerated the universal service and access programme in Africa. In doing this, the paper posits an holistic approach to extending information and communication technology services. This approach takes cognisance of the socio-cultural landscape and also notes that information and communication technology service extension should work in tandem with extension of other social utilities. A universal access wheel is conceptualised, which proposes that various elements should be in place, in order to achieve the goal of universal access, specifically in Africa. The paper revisits the diverse meanings of universal service and access and analyses the importance of providing access to information and communication technology services in developing regions of the world, such as Africa. The universal access wheel does not project totality; rather it provides flexibility and dynamism typical of the information and communication technology sector. Consequently, as other elements and issues arise, they may be added to the wheel.

Introduction

At a recent conference in Botswana on improving human capacity through training and knowledge exchange in the information and communication technology (ICT) sector, a participant spoke about how he had bought a mobile phone set for his mother, who resides in a rural village without basic social utilities like pipe-borne water supply and electricity.[1] Once or twice every week, the man's mother travels about 50 kilometres to and from the nearest town to recharge the battery of the mobile phone. It is stories such as these that have dissipated the euphoria that accompanied the introduction of modern communication technology into underdeveloped contexts. This instance and many like it demonstrate some of the myths that surround the concept of universal access. Providing access to ICT without access to attendant utilities such as electricity, undermines the entire purpose of the exercise. Further, the anecdote does not describe an isolated instance in Africa; millions of people reside in rural and remote villages without electricity and other basic social utilities. Instances abound of multi-purpose community centres (MPCCs) and telecentres in rural locales being vandalised and equipment stolen, possibly to be sold to meet more urgent social needs. The assumption that simply making available telecommunications devices in semi-urban and rural areas contributes to increased universal access is erroneous.

The challenge for policy makers and national governments in Africa is to develop appropriate policy – policy that enhances the universal diffusion of and access to ICT services by adopting an holistic approach that takes cognisance of the social, cultural and political needs of the community. Undoubtedly, the liberalisation of the telecom market has contributed to an increased teledensity in Africa, particularly evident in cellular phone penetration. For instance, in 2000, smaller countries

1 *NetTel@Africa Safari.* University of Botswana, 25 May-7 June 2003.

such as Reunion and Seychelles had already achieved up to 50% cellular penetration (Gebreab, 2002). While telecommunication corporations and national governments have continued to set universal target goals, the realities of most African states and the absence of an inclusive approach towards these goals have rendered such targets a mirage. For instance, in 2002, Telkom, the South African telecommunications incumbent, disconnected 40% of the 2.1 million phone lines it had delivered over four years as part of its roll-out obligations. Among other reasons, the non-payment of services was cited for this action. This has affected the South African Government's universal service goals and plans (Chalmers, 2002).

This paper proposes that achieving universal access in Africa should adopt an all-inclusive approach that takes cognisance of various issues peculiar to developing regions. A wheel model of universal access is proposed in this paper, which notes that apart from the physical provision of technology, other social, economic and cultural issues come into play in achieving universal access in Africa. The following section attempts to clarify meanings associated with the concepts of universal service and universal access, before embarking on an elaboration of the wheel model.

The scope of universal service and access

Attempting to define the terms universal access and universal service highlights contextual differences. Discussions of the term universal service commonly commence with an admission that there is no universal and fixed meaning of the term. There is no universal consensus on what this term refers to and why it should be a policy goal. The term provides a range of meanings that is "so wide as to allow both right-of-centre and left-of-centre politicians to consider it a laudable objective, notwithstanding the fact that their respective interpretations of that objective may actually be polar opposites" (Preston & Flynn, 2000).

Historically, the term universal service was first used at the beginning of the 20th century, when Bell Telephone Company, the forerunner of AT&T, in a bid to forestall competitors pursued a policy of system integration to interconnect competing local exchanges into Bell's "grand system". Universal service then meant everywhere, rather than everyone (Verhoest, 2000). The term first appeared in print in 1907 in AT&T's Annual Report, when the president of AT&T, Theodore Vail, introduced the term universal service as a company policy. Facing competition, AT&T came up with a universal service goal of creating an integrated network that was universal, interdependent, interconnected and intercommunicating, and that would enable all telephone users to communicate with one another (Preston & Flynn, 2000). This conception was different from the contemporary idea of universal service as an egalitarian and socially responsive policy.

Generic definitions of the two concepts of universal service and universal access have been propounded and accepted in academic and policy management milieux; however these concepts still provide a wide range of differing meanings crafted to suit individual experiences of different countries. In generic terms, universal service connotes availability of connection to ICT by every home and household in a country. It implies providing ICT services to individual households in rural, semi-urban and urban locales of a country. While this may be an attainable policy for most developed countries, it remains a lofty goal for most developing countries. Universal service policy can be expanded beyond physical connection to a network to include a variety of other concerns. Namely, universal service should also imply that the cost of ICT services – such as the basic telephone cost – remains affordable, especially to those from low-income families and people living in rural and suburban areas. Universal service policy should also involve providing appropriate content on a familiar platform to users, such as providing relevant content in local languages in the case of Internet services. Irrespective of the general definition of universal service, most developed

countries of the world have also extended the scope of universality of telecommunications services. Intven, Oliver & Sepulveda (2000, 6-10) note that in Spain universal service implies basic telephone service, including local, national and international access; free directory services; public phones; and special services for people with disabilities. In the United States of America (USA), universal service means voice-grade access to the Public Switched Telephone Network – or PSTN – with the ability to place and receive calls; access to emergency services; access to operator services; access to directory services; and access to long distance services.

Universal access indicates a situation where every person has a reasonable means of access to publicly available telecommunication services. Compared to the universal service policy, universal access policy is a more practical and achievable goal for developing countries. Universal access aims to increase access to telecommunications services on an institutional and shared basis, such as on a community- or village-wide level. It encourages the installation of public payphones and telecentres in rural or remote villages or low-income urban areas, with the aim of providing a basic connection to public telecommunications. African countries conceptualise universal access in a variety of ways:

- In Kenya, universal access implies a phone within walking distance.
- Lesotho sees universal access as having a public telephone within ten kilometres of a community.
- In Togo, universal access means a telephone within a five kilometre radius by 2010.
- Zambia sees universal access as telephone booths in public places (such as schools and clinics) countrywide.
- For Mozambique, universal access means a public telephone within a distance of less than five kilometres, with at least one public telephone in each of the country's district centres (International Telecommunication Union, 1998).

While access and services have been previously defined in the context of telephone services, they encapsulate a whole range of telecommunications and communication technology services, including basic telephony and Internet services.

Contributing to the wide range of discussions in the discourse of universal service, Laffont & Tirole (2001: 219) acknowledge that it is knotty issue. They go on to identify and discuss two common rationales for universal service:

- *Redistribution towards needy customers*: This includes low-income residents, disabled customers, and elderly and rural customers with limited geographical mobility, who arguably might need to be protected against the sharp increases in rates that would be associated with full rate balancing.
- *Regional planning that attempts to encourage a more harmonious distribution of residents away from large congested metropolitan areas*: This rationale is based on the existence of externalities: *negative* non-internalised congestion externalities in large cities; *positive* social benefits from maintaining a rural habitat.

As noted earlier, different definitions and conceptions of universal service are constructed to suit individual discourses and social milieux of various governments. However, it can be stated that the basic objectives of universal service/access are to enhance:

- *accessibility*: access to basic telecommunication facilities to everyone including people with disabilities, at a reasonable price and distance;
- *equity*: equal service to every community, whether rural or urban;
- *connectivity*: every community and the country at large must be interconnected; and
- *flexibility*: communication should be flexible, without barriers.

Pascal Verhoest (2000), writing on *the myth of universal service*, notes that the meaning of universal service varies between an economising mode and a socialising mode. While the economising mode discussion is on the efficiency and distribution of *economic welfare* – focusing on three basic criteria of accessibility, affordability and quality of service – the socialising mode argues for the notion of a *general welfare* and citizens' rights to access communication resources.

Verhoest argues that our perceived meanings and received ideas about the universal service concept consist purely of historical mystification and how political players use and reinforce these myths. Accordingly, he argues, the

> dual meaning of the concept gives a social connotation that can easily be misappropriated to legitimize a policy which is primarily guided by narrowly defined market economic principles and reduces the possibilities for the provision of services on a non-market basis (Verhoest, 2000: 596).

Consequently, it is argued that conceptual clarity may be achieved by distinguishing basic universal obligations (with their inherent market-oriented criteria) from a social service obligation (which elaborates on non-market criteria). While political players, regulators and policy makers always eagerly argue for the socialising mode, projecting the social criteria for universal service within the ambit of general welfare and citizens' rights to access communications resources, the reality is that universal service in practical terms has both economic and market criteria dimensions.

Let us take, for instance, the European Commission's definition that

> universal access means a defined set of services of specified quality which is available to all users independently of their geographical location, and, in the light of specific national conditions, at an affordable price (Verhoest, 2000: 599).

It is worth noting that the key issues of universal service (accessibility, affordability and quality of service) cited in this definition describe an output that corresponds with the classical definition of economic efficiency. In market and economic processes, products and services are first offered at the lowest possible price to reflect an optimal production cost (affordability); they would thereafter be optimally distributed among the members of society (who are geographically dispersed) given their disposable income (accessibility); and, of course, there would be an optimal level of innovation (quality) (Verhoest, 2000: 599).

Goggin & Newell (2000) agree that there are limitation in how universal service programmes are both defined and implemented. They note that the traditional definition of universal service has been tied to the issues of universal availability and affordability of telecommunications; universal accessibility is a neglected element. Further, they argue, in situations where accessibility is highlighted, it is done on the premise of availability and affordability – with little mention of accessibility to people with disability, for instance. They note further that people with disability were inadequately served when universal service was based solely on the availability and affordability of basic voice telephone service and that this can still be said of a wide range of ICT applications in the currently evolving information society. It is argued that most countries have not taken the accessibility issue of universal service beyond the availability and affordability dimensions, "with the result that the right of people with disabilities to universal telecommunications service has neither been guaranteed nor delivered" (Goggin & Newell 2000: 129). Debate continues on the real meaning and implementations of universal service, and questions abound on the scope of universal service. To put it concisely, "are governments, regulators, corporations, and communities finally refashioning universal service so that it is truly *universal*?" (Goggin & Newell 2000: 129). This is a key question that should be tackled in our contemporary conception of universal service and access.

The universal access wheel

Achieving universal service and access is a continuous and dynamic process, and one that varies from region to region. Different countries provide different socio-economic and cultural peculiarities, which impact on universal access programmes. Many academic theses have expounded and critiqued different approaches to attaining universal service and access to ICTs. For instance, Clement & Shade (2000) provide an influential model called "Access Rainbow", whereby a seven-layered design of universal access is proposed. The "Access Rainbow" provides a seminal approach to universal service provision and enumerates various important issues that can help in facilitating universal service to ICT. However, this model, like most models, provides an exclusively Western approach to universal access; the model neglects some socio-cultural and political-economic situations of most developing regions of the world, such as Africa.

Verhoest (2000) identifies the problem of social exclusion in addressing universal service programmes. He proposes that a more pro-active policy is indeed needed to ensure that everyone can access the ICT system. In this regard, he argues that a universal service policy regulation should ensure equal access to all ICT services including new services, such as the Internet. In addition to arguing for a pro-active and all-inclusive policy, he further notes that physical access to hardware does not imply access, and that physical access should also include the availability and affordability of relevant content. He states that, "it is useful to distinguish physical access from dispositional access, that is the cultural, intellectual and practical dispositions required to function in an information rich environment (Verhoest, 2000: 607). This is an assertion to which this article subscribes and which also informs the universal access wheel model proposed here.

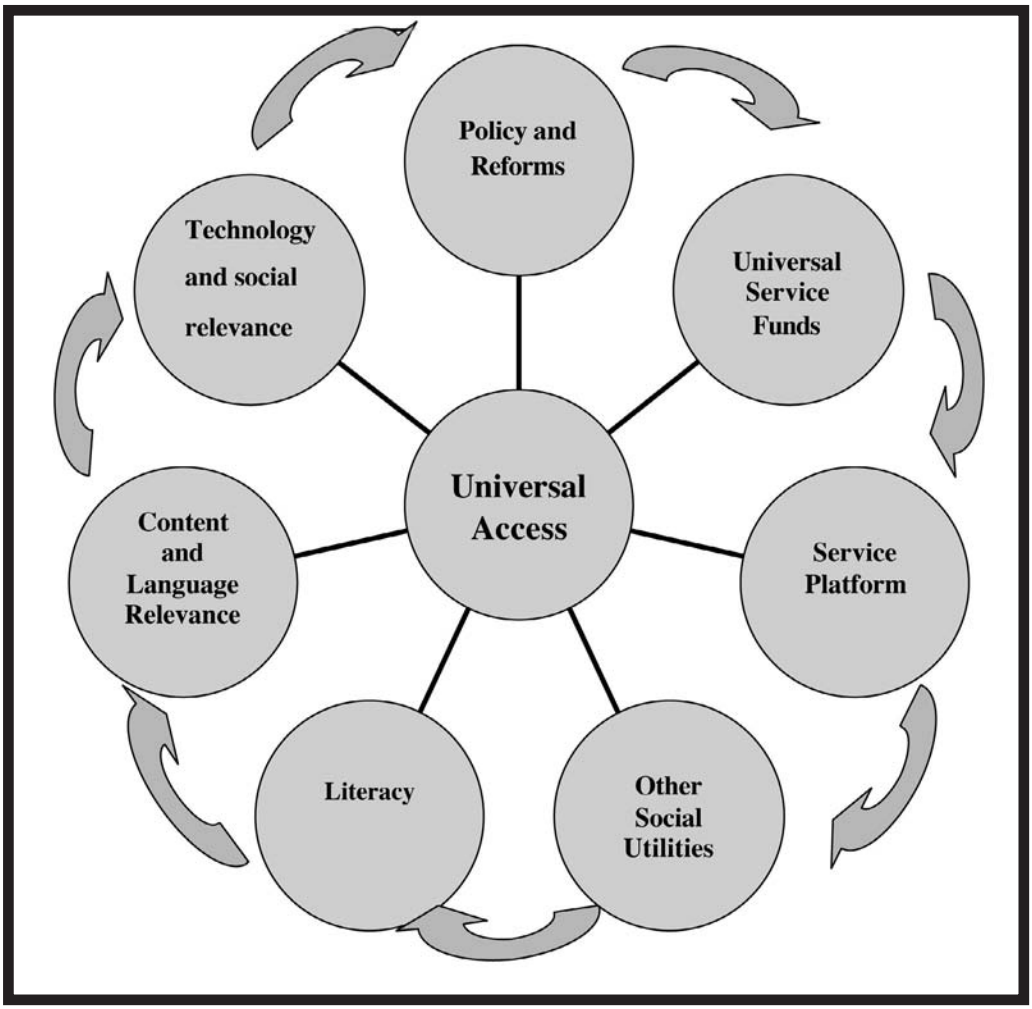
Singh (1999), in his critique of leapfrogging development through telecommunications, identifies various myths about the concept of leapfrogging. Leapfrogging, in the ICT context, refers to the belief that telecommunications can accelerate the pace of development and facilitate economic transaction by serving as the neural system of an economy, and is about helping the developing world connect with and gain from the fast-evolving global economy. Singh (1999) argues that while this may be true, "the universal promises of these technologies get considerably sobered when specified in terms of political economy". Thus, according to Singh (1999), leapfrogging development brings about many myths about telecommunications. One such myth is the *myth of technocratic progress and efficiency*. This is a tacit belief that technology and access thereto can help solve all problems in society. Inserting this technocratic belief into telecommunications supposes a correlation between a given amount of telecommunications and a given amount of growth; in other words, a given amount of Gross National Product in a country is taken to reflect a certain number of telephones for a country. This belief then creates two further, related myths: one that compares telecommunications indices across countries to argue that more is better; and the other that supposes that given a certain amount of telecommunication infrastructure, development benefits to the society would be automatic. Singh (1999: 210) summarises this succinctly when he argues that "rather than links with user-groups and their needs, we still have emphases on numbers and indices of telecommunications that without taking the former into account mean little".

What is apparent in these arguments is the theme that universal access programmes should take into consideration the needs of the people, the socio-cultural nature of their livelihoods and the realisation that physical contact to telecommunication infrastructure does not automatically connote real access. The "universal access wheel" model introduced here is informed by some of these critical issues; the model takes cognisance of socio-cultural aspects of the African continent and can easily be adapted to other developing regions of the world that are going through a transitional development process.

The “universal access wheel” model is conceived on the following rationale:

- The ICT sector is a dynamic phenomenon. Technological development in this sector is not static but moving at an alarming rate.
- The wheel shows the interrelatedness of various elements; it also portrays the relationship of these elements to the core issue of universal access.
- The wheel represents the idea that if all the elements are properly implemented, a smooth process of achieving universal access and service can be predicted. By the same token, a badly managed element in this wheel becomes an obstacle to the smooth movement of the wheel.
- Because universal access and the ICT sector in general are dynamic phenomena, the wheel model is designed as a flexible system. The wheel does not project totality; rather, it enables flexibility. Consequently, other elements can be added as the sector and the process evolve.

Figure 6.1: The universal access wheel



The following discussion attempts to analyse each of the issues identified in the universal access wheel and discuss their relationship to improving access to ICTs.

Policy and reforms

Policy in telecommunications is a rule-making mechanism that creates access to affordable services for citizens, enhancing the free flow of information in society and encouraging diversity within the communications sector (Gillwald, 1998). Telecommunications policy within nations and the international arena has consistently focused on the provision of universal access and service in terms of telecommunications and communications technologies. African states must draft policies that encourage universal access to ICTs. The issue of access to telecommunications, and ICTs in general, should be conspicuous in policies and regulations. For instance, among its objectives, the South African Telecommunications Act (1996) includes the provision of universal and affordable telecommunication services and a commitment to the universal provision of telecommunication services. Crafting universal service/access policy is a very important step towards achieving universal diffusion of telecommunication services. Universal service policy serves some critical objectives:

- *to allow citizens to participate in the modern society*: Telecommunication provides a platform for all types of information to be disseminated to the public. These types of information range across a variety of services: government, social, health, education and e-commerce. Citizens without access are cut off from the modern "information society". Increasingly, access to these technologies is viewed as a basic right of all people.
- *to promote national political, economic and cultural cohesion*: A universal diffusion of ICT services in a country would facilitate activities in all spheres of nation-building.
- *to promote economic development*: The ubiquity of the Internet and e-commerce has engendered a "new world economy"; access to ICTs will encourage a widespread national participation in this economy.
- *to reduce urban migration and facilitate development of urban areas*: ICTs can reduce urban migration and encourage development of remote areas outside congested urban areas, as they encourage "telecommuting", "teleworking" etc.
- *to eliminate disparity between rural and urban areas*: The majority of people in Africa reside in rural areas where there are minimal telecommunications services. Increasing access to basic telephone and community Internet services, for instance, can reduce the "technological divide" (Intven, Oliver & Sepulveda, 2000).

Universal service policy should set targets, goals and time frames and encourage public participation in the process. Public participation adds a democratic dimension, helping to give meaning to the idea of participatory citizenship. As Gillwald (1998: 33) notes "citizenship, to be meaningful, requires effective participation in decision-making". In addition, African countries should embark on market reform strategies based on ICT policy. This reform should include, among many others:

- liberalisation of the ICT sector, which would bring with it an introduction of competition into the market. Competition can deliver many advantages, such as serving to increase consumer choice, enhance quality and standard of service, reduce the price of services, stimulate growth in the market and, most importantly, enhance access to ICT services. In competitive markets, providers offer services in close proximity to consumers, while competing network operators attempt to source new and untapped markets. For instance, the introduction of competitive mobile telecommunication networks in Africa has contributed considerably to "teledensity";
- including universal service obligations (USOs) as part of licence conditions for operators; and
- a cross-subsidisation mechanism to encourage operators wishing to provide services in uneconomic areas.

Such policy and reform concerns require appropriate management in order to foster proper implementation. This suggests the need for a regulatory structure to be configured to implement and manage policies in a liberalised market. The regulatory authority manages the market conduct of operators so as to guide issues such as pricing strategies and anti-competitive conducts of operators.

The Universal Service Fund

Universal Service Fund (USF) is a system designed to enhance and achieve universal service and access goals. Achieving universality in ICT is a capital-intensive endeavour. Concomitantly, revenues have to be generated to be able to enforce and implement universal access programmes. USFs have been used in many countries to improve access through network roll-outs and to finance universal service projects. There are various services that the fund can support. In Africa, emphasis has been placed on ensuring basic public access (i.e. voice-grade fixed access to the public telecommunications network). However, with the growing importance of the Internet to national economies, USFs should also support public access to value-added services, including Internet access. Revenues for USFs can be generated in a number of ways: national budgets of governments, charges on interconnecting services, levies on subscribers (e.g. on access lines) and levies on operator revenues. Funding from international development agencies is another option that has been useful in most developing countries (Intelecon, 2002).

It is vital that structures be created to manage and administer USFs. Examples can be cited of structures being set up in some African countries to manage the country's USF. The Rural Communications Development Fund (RCDF) in Uganda is managed by the regulatory agency, the Uganda Communications Commission. Sources of funding are generated from all sector participants (including telecom operators, the postal service, couriers and Internet Service Providers, or ISPs), which are required to contribute 1% of revenues to the RCDF, and also from national operator licence fees. The Fund supports various projects in Uganda, such as universal access telephony in all districts not served by the major operators; special equipment that would extend the reach of existing telecommunications networks into rural and remote areas; and Internet points of presence and wireless access systems at district centres. The RCDF also supports a national Internet Exchange Point, or IXP, to: facilitate inter-ISP traffic; facilitate Internet access projects for schools, non-governmental organisations (NGOs), small-scale commercial telecentres and Internet cafés at sub-district level; and pilot content creation projects in telephony and Internet areas (Intelecon, 2002).

In South Africa, the Universal Service Agency, a statutory body established by the Telecommunications Act of 1996, administers the country's USF. To generate revenue for the Fund, all telecommunications licensees must pay annual contributions to the Fund. Operators are required to contribute a minimal percentage (about 0.16%) of their annual revenue, from the provision of the corresponding telecommunications services. Value-added network services and private network licensees are also required to make contributions to the Fund. The project supported by the Fund is the establishment of telecentres in the country.

As more and more African countries are liberalising their telecom sectors and as the market grows, it is imperative that consideration be given to establishing a universal service/access fund, revenues from which could be utilised in meeting ICT universality objectives. It is also important to note that there are various sources of funding for universal access programme. Siochru (1996) identifies two major categories of funding: sector-internal sources and sector-external sources. The sector-internal funding is from within the telecommunications industry. Examples of sector-internal methods are profit re-investment, licence fees, USF or obligatory contributions, interconnection

fees, licence conditions and tariff structures and control. In most cases sector-internal funding methods are unable to fulfil the USO within a specified period, so funding from the outside sector (external) is required. Basically, there are three ways of raising funds through sector-external sources: direct government investment, loans and development assistance and privatisation.

Service platform

Access to ICT services can be gained in two ways – through individual home connection to telecommunication networks and through institutional access. In Africa, only a few can afford to have direct connections in their homes; many of these are urban residents with the economic clout to be able to afford direct connection. The greater proportion of the population in Africa resides in semi-urban, rural and remote village areas. This class of people constitutes the poor who, due to their state of poverty, cannot afford a direct connection to the telecommunication network. Regrettably, telecommunication networks do not reach these remote areas. Institutional access then becomes the main gateway to ICT networks for millions of people in Africa. Institutional access includes access through: places of work and local public access points, such as schools; clinics; day care centres; post offices; and community centres or telecentres. A telecentre is "a facility that offers the public access to advanced IT and telecommunications equipment, together with some degree of support and training and a range of information-based services" (Conradie, 1998: 98). Telecentres – also termed community technology centres, community teleservice centres, telecottages and MPCCs – are some of the major ways of providing access to numerous Africans who reside in the continent's remote villages.

Two models of telecentre can be identified in Africa: private telephone shops and a government or externally funded ICT MPCC (African Community ICT Experience, 2000). The private telephone shop model has been effective in some African countries (e.g. Ghana, Senegal and South Africa). Local and small-scale entrepreneurs can be encouraged to open telephone shops, with financial assistance where necessary. In this way, the local economy of rural areas can be boosted and residents can have access to telecommunication services. ICT MPCCs offer a range of services such as basic telephony, computing, fax and Internet services. The telecentre projects emphasise community participation in the establishment of these centres; in addition, local entrepreneurs can invest in the telephone shops.

National governments should make it a telecommunications priority to provide public payphones in public places. Conradie (1998) notes that for a telecentre project to be effective in Africa, socio-cultural aspects that may affect the use of the telecentres should be investigated and there should be a participatory needs assessment to help identify information and training requirements of the local population. In addition, Conradie (1998) notes that considerations for successful implementation of a telecentre should include:

- identifying of local pioneer scouts or champions with a vision;
- setting of a clear objective for the telecentre project;
- involvement of other organisations. Apart from state help, local and other organisations can play a supporting role. Support from external organisations such as international development and funding agencies can also be effective;
- participation of extension agents, NGO workers and rural teachers to facilitate links between ICTs and rural inhabitants;
- provision for on-going training;
- adoption of a community-centred approach so as to foster community participation and ownership; and
- monitoring and evaluation of processes of development regarding the telecentres.

Other social utilities

The example cited earlier of the village woman making a 50 kilometre trip weekly to recharge her cellular phone typifies the need for utilities such as power supply to work in tandem with rural telecommunication network extension. Providing access to telecommunications without providing access to other basic utilities – such as pipe-borne water, health and medical services, education and poverty alleviation programmes – renders telecommunication service extension ineffective. As mentioned, accounts abound of telecentres and MPCCs being vandalised and equipment stolen, probably resold to meet more pressing basic needs.

The argument put forward here does not attempt to deny the ability of ICTs to facilitate development in many communities. The potentials of ICTs to aid development are well documented. For instance, in their influential analysis of the potential uses of ICTs for development, Mansell & Wehn (1998) critically discuss how ICT applications can be useful in numerous instances to facilitate the development of various aspects of societies. They state that ICTs can help facilitate development in government public administration activities, urban and rural development, transportation, health (as in telemedicine), special needs for the physically challenged, education, commerce and so forth. Mansell & Wehn (1998: 83) also note that "economic development can be fostered by tele-working and tele-services in some of the developing countries".[2] The overall postulation is clear: the belief is that, for instance, the establishment of telecentres in rural communities can facilitate economic empowerment; that mobile telephony, for example, can help rural entrepreneurs to keep in touch with markets outside their communities. While this much is true, the social conditions of most people in Africa and other developing regions in the world provide a different reality; ICTs do not single-handedly foster development and the absence of other social utilities has an adverse effect on the potential of ICTs to aid development.

Electric power generation and consumption are very low in Africa. For instance, at the beginning of 1997, the electric generating capacity in Africa was only about 3% of the world's total (Energy Information Administration, 1999). By 2001, Africa's electricity consumption was still about 3% of the world's total consumption (Energy Information Administration, 2003a). Access to a central power grid is a major challenge for Africa. Apart from southern Africa and, to a lesser degree, North Africa, electrification rates are very low in Africa. As a result of this, *per capita* electricity consumption is extremely low in Central, East and West Africa. In the year 2000 the net electricity generation in Nigeria, the most populous country in Africa, was about 15 billion kilowatt-hours; South Africa generated about 196 billion kilowatt-hours (the highest on the continent); and Egypt (the second highest in Africa) generated 72 billion kilowatt-hours. In fact the total electricity generation in Africa in the year 2000 was 416.9 billion kilowatt-hours – as compared to 3 802.1 billion kilowatt-hours in the USA (Energy Information Administration, 2003b). It is imperative that African countries encourage and facilitate access to this and other social utilities.

There is barely access to clean, pipe-borne water in most African countries. It is either a case of water pipe networks not being connected or rates being unaffordable for the majority of the population in most African states. In South Africa, people have organised protests against Government, demanding free electricity and water. The South African Government, in turn, made a policy decision (adopted in 2002) on free basic electricity. In this policy, the Government aims to provide poor households with 50 kilowatts of electricity per month. The Free Basic Water

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[2] Note, however, the cautionary remarks of Mansell in her paper elsewhere in this edition, on *ICTs for Development: What Prospects and Problems?*

Programme, by the same Government, aims to provide every household with 6 000 litres of free, clean, drinking water per month. The reality of the situation in Africa is that millions of people still trek for kilometres to scoop water from streams. For such people, access to a communication technology network or infrastructure is not a priority. In situations where these infrastructures are provided, they are not fully utilised.

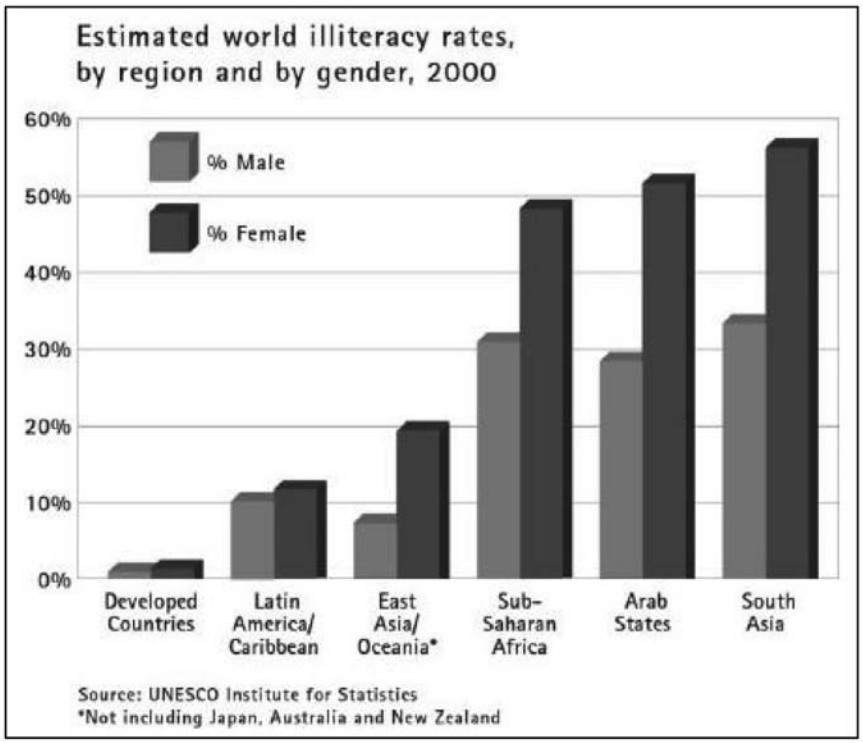
It is futile to locate telecentres in communities that lack other social utilities. Having direct or individual connection to telecom networks and services is not a major priority for a community that battles daily with poverty and lack of other basic social amenities. Poverty on its own is an endemic problem in Africa; millions of people live on less than US$ 2 a day, according to the World Bank's Purchasing Power Parity (World Bank Poverty Measurement Data, 2002). To these people, meeting daily basic needs is more important than access to network technologies. ICT network and service extension should work with other policies that focus on extending access to other basic social utilities. National governments in Africa should take an holistic approach to social development issues, and policies should be drafted to focus on extending access to numerous social utilities. Universal access policies in the telecom sector should work in tandem with other sectoral policies of national governments.

Literacy

A secondary or tertiary education is not a requirement to access information on an ICT platform, but a rudimentary level of literacy is required and is very important in order to be able to utilise the advantages that ICTs offer. To access information on ICT platforms, basic technical skills are necessary. ICTs are complex technologies and even the simplest device requires a basic literacy level. Literacy in this regard involves the skills needed to use these technologies, identify the functionalities of these technologies (including their advantages), and the ability to adapt these technologies to individual needs. Examples of such skills are computer skills, which include keyboarding skills and the ability to utilise computer software and programmes; and Internet skills, which include the ability to search for information online, the ability to navigate the web, and the ability to use email.

There is a high rate of illiteracy in Africa and in most developing regions of the world; statistics show that this rate is higher among the female gender in Africa and in the Arab and Asian regions. This rate is intensified by cultural, religious and economic issues. In some countries in Africa, the illiteracy rate among the female gender is as high as 70%. For instance, in the year 2000, Senegal and Benin had over 70% illiteracy among females (UNESCO, 2002).

Figure 6.2: Estimated world illiteracy rates, by region and by gender 2000



As illustrated by Figure 6.2 above, illiteracy rates are high in developing regions of the world. Arguably a rudimentary level of literacy can help in facilitating basic access to information on ICT platforms. In rural areas of Africa, most people lack these basic computer skills and this becomes a hindrance in universal access programmes. There are still people who refrain from using computers due to unfounded cultural beliefs, phobias and the perception that computers are for the highly literate in the society.

As African countries strive for universal access to education, such as the universal primary education programmes, it is of the utmost importance that curricula – in both formal education and adult education programmes – be structured to include basic computer and technical skills. For any universal access programme to be successful, there needs to be ongoing training, and issues of literacy need to be taken into account and noted in ICT policy. In terms of the kind of cultural, intellectual and practical disposition required in order to function in the information society, Verhoest (2000: 607) argues that ensuring access requires "an information and communication policy that not only encompasses sector-specific and social policies, but also such areas as education and culture at large".

Content and language relevance

The role of extending ICT infrastructure is to facilitate access to a wide range of information that could be useful in the daily lives of people. For citizenry to be meaningful, people must have access to information that will facilitate political, economic and social participation in the community. In

the case of the Internet, the web offers pools of online information on any phenomenon and there are millions of pages on any known issue. For millions of people in Africa to benefit from ICT, the content of the information must be conditioned to suit specific needs. Such information must be relevant to people's day-to-day experiences and expectations, and the information must meet their requirements to actively participate in the community. Such information should include government public administrative activities and how to access social benefits, and other information such as pension, social grants and so on. Such thinking informed the decision of the South African government to establish Public Information Terminals (PITs). The PITs – Internet kiosks to be located in post offices around the country – will provide instant access to the Internet, e-mail, Government and educational services, and e-commerce. The links to government websites, for example, will provide information on aspects of regulation, legislation, welfare, support, grants and rebates. They will also offer interactive directories of various tertiary institutions (Matsepe-Casaburri, 2000).

Unfortunately, information on the Internet is predominantly in English. This disenfranchises millions of people in Africa, whose competence in the English language is minimal. English, French and Portuguese are second languages to millions of Africans, who communicate more effectively in their indigenous languages. African policy makers and information developers should highlight the need for and help accelerate the process of developing content in local languages; we already see examples of Japanese, Chinese, Russian, German (and so on) language content on the Internet.

Broadcasting too needs to provide content that is relevant to the community it serves. Many African countries are beginning to realise the importance of local content in the materials broadcast to audiences, and hence we are beginning to see a gradual increase in emphasis on policy formulation on local content in the media. Telecommunications services should provide options in local languages, for example, in the case of operators and emergency services, and data and language on users' devices such as cellular phones. The language relevance of content is an important aspect in extending access to ICTs, and policy makers need to be giving prominence to this when formulating policies on universal service and access. The argument put forward for extending the public service broadcasting ethos into the ICT services sector can be supported; this argument is based on the idea that the convergence of the mass media and telecommunications, along with the advent of the information society, may call for the application of the public service logic to the telecommunication sector as part of the ICT sector as a whole (Verhoest, 2000).

Technology and social relevance

Information and communication services rely heavily on a variety of technologies and communication systems. African countries need to invest in appropriate technologies, which take cognisance of the topography and landscape of the region. The copper and cable transmission systems have not contributed to extending services in Africa. Many people in Africa reside in rural, sometimes rugged, terrain and are consequently excluded from telecommunication cable extension. This has resulted in the low teledensity that has characterised the African region for years. Copper wire, for instance, has been used by many developing countries of the world, due to its affordability and ease of installation. However, copper wire also has numerous disadvantages: the maintenance cost is high; and it is susceptible to corrosion, rain and theft.

Fibre optic cables offer numerous advantages over copper and coaxial cables: fibre optic cables provide a higher transmission capacity; provide broad bandwidth; are easily transportable; are immune to electromagnetic interference; and provide capacity to transmit all forms of communication (voice, data and video). Due to the advantages that fibre optic cables offer, telecommunication companies all around the world are replacing their cable systems with fibre optic cables. Negroponte

(1995) notes that fibre optic cables are the ideal transmission system for developing countries, not only because this system is secure, faster and more interactive than other cable systems but also because it can be linked directly to the end-user terminals such as telephones, television sets and radios. Pauw (1994) also believes that fibre optic cables are applicable to most developing societies. He notes that "optical fibres specially made for rural applications are available offering more bandwidth than coaxial cables at not much higher cost. Also, it has the all-important immunity against lightning damage that plague metallic cables" (Pauw, 1994: 191). While these assertions are true, the adoption of fibre optic cables in many African countries has been hindered by financial constraints.

Wireless transmission systems have been instrumental in the extension of ICTs in Africa. Satellite technology has improved telecommunications and broadcasting services. Satellite technology has the potential to beam signals across different countries; this has improved international telephony enormously. Satellite technology has also improved television signal transmission. Over the years satellite transmission for telephony has been considered inappropriate, due to the fact that the time taken in beaming the signal to space and back to earth creates a short delay between exchanges of conversation; this also leads to the sound of an echo in telephonic conversations. However, the VSAT satellite has addressed this problem. Satellite voice communication, for a long time, was beyond the reach of rural subscribers in developing countries. However, developments over the years have made direct access voice services available on a large scale, even to rural subscribers. For example, these services can be accessed through a briefcase-sized portable terminal (Westerveld, 1994). Perhaps the most interesting development is that of fixed cellular systems, which are of great benefit to rural subscribers; this system uses the existing cellular mobile telecommunications system with fixed rural subscribers.

The adoption of wireless telecommunication in the 1990s in Africa has led to an upsurge in cellular telephony. Gebreab (2001: 8) asserts that "by 2001, more than 90% of African countries had already adopted cellular telecommunication technologies as compared to just 18% in 1993". Today, cellular telephony has penetrated numerous rural areas in Africa that fixed-line cable extension has failed to reach in decades.

Extending universal access also implies that telecommunication devices and users' devices should be socially relevant. Universal access should take into account the needs of the elderly and the physically challenged in communities. Since the focus of universal service and access is on extending telecommunication services to the general populace, the needs of these categories of people in society should be considered in any universal access programme. African governments should create an enabling environment for people with disabilities to function and use services within the telecommunications sector. This group has special telecommunication needs that must be addressed by equipment manufacturers. Service providers should also provide facilities that enable the elderly to take advantage of the opportunities provided by telecommunications. Goggin & Newell (2000: 127) propose a rethink of the concept of universal service to genuinely include access for those who are physically challenged. They argue that "technological design that is responsive to disability concerns will ensure genuine universal service for all".

Ballabio & Cullen (1996) provide a seminal compilation of telecommunication technology, applications and requirements for meeting the needs of the physically disabled and the elderly. This compilation is based on the findings of a research project by the European Commission's Telecommunication for the Elderly and Disabled. Although the contexts that inform people's needs vary from region to region, the applications listed by Ballabio & Cullen are adaptable to the needs of the elderly and the disabled in Africa:

Interpersonal communication: Ballabio & Cullen (1996) note that, although fixed and mobile telephony systems would remain the core applications for the elderly and the disabled, the nature of certain disabilities precludes some people from using a two-way voice communication system such as voice telephony. For instance, people with hearing and voice impairment would require text or video telephony and some might prefer communication through symbolic languages.

Relay, conversion and alternative media: To communicate with another person or to be able to access the mass media, people with certain disabilities would require special facilities. For instance, a hearing-impaired individual using a text telephone would require an interpreter facility or relay to convey conversation from a basic voice telephone from a receiver/sender on one end to a text format for the hearing-impaired on the other end. This also applies to accessing information in the mass media, and the need for text captioning of speech content in the media; the visually impaired would require conversion technology to transfer, for instance, newspapers and books into audio/electronic formats.

Remote activities: Telecommunication systems can facilitate remote activities such as banking, shopping and other important activities to people impaired due to mobility restrictions. Such systems can open up new opportunities for employment and education, for example, distance and online education and telework.

Remote services and support: Many disabled and elderly people need support from care services to help them function and live well in a community. Telecommunications systems can help by supporting alarm systems and other security services based on voice and video connections to remote care services and support – such as telecommunications links to medical monitoring and consultation. The table below presents various telecommunications needs and their applications.

Table 6.1: Some applications of telecommunication for disabled people and the elderly

Interpersonal communication	**Relay, conversion, alternative media**	**Remote Activities**	**Care services and support**
Voice	Text telephone relay	Information access	Alarm/security
Text	Video telephone relay	Teleshopping	Social services
Special media	Electronic newspaper and books	Transactions	Telemedicine
	TV (closed) text captions	Telework and Distance learning	Navigation support
	TV audio description	Entertainment and leisure	

Source: Ballabio & Cullen (1996).

Conclusion

This paper has attempted to extend the concept of universal access to ICT beyond physical contact with communication technologies. The paper takes an holistic approach to the idea of providing universal access, particularly in Africa. The paper suggests that the universal access wheel be employed in the implementation of policy relating to access to ICT services in Africa. The paper notes that physical access does not imply appropriate utilisation, and that there needs to be appropriate training in order for people to benefit from ICT. Information that is presented on ICT applications should be socially, economically, politically and culturally relevant to the community and should be presented in familiar languages. The extension of ICT should employ appropriate technologies that take cognisance of the topography of communities, cultural orientation and physical capabilities.

The paper notes a further three important issues: firstly, the idea that universal access is achieved by mere provision of physical connection to ICT infrastructure is a myth. Physical connection does not connote access. What is the essence of physical contact without the ability to utilise and explore the potentials of the technologies? Secondly, the paper proposes a vision of African countries on the right path to achieving universal access – provided that they take into account the important and interrelated elements/variables discussed here in relation to universal access. Finally, the paper identifies some of the issues with which African states grapple – issues representing cogs in the wheel of achieving universal access. Such issues include electricity supply, poverty, education, water supply, health and medical services, and so on. These are the realities of situations in many African states and they adversely affect the achievement of universal access to telecommunications. Achieving universal access is a phenomenal task, which could be accomplished with appropriate policy that takes cognisance of the numerous socio-cultural issues, and such policy must work in tandem with other sectoral policies of national governments.

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